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GENERAL NOTES.

Vacation Pastimes.—Authors do not always realize that a great deal of time might be saved to those who use their books if they would give accurate and exact information concerning the works to which they make reference. I have recently had occasion to use Professor NEWCOMB's work on the Precessional Constant.* In this memoir the author refers a number of times to his own work, "Elements and Constants," but at no place in the memoir, so far as I am able to find, does he give an exact reference which would enable one not familiar with the work to readily obtain it. Now possibly anyone who makes pretense to being an astronomer ought to be ashamed to admit that he is not familiar with this work, but I am obliged to make this ignoble confession. Having learned of its existence, however, I became possessed of a strong desire to see the book. The card index of the University library threw no light upon the subject. As many of Professor NEWCOMB's most valuable contributions to astronomical science have been published in the *Astronomical Papers of the American Ephemeris and Nautical Almanac,* the next thought was to look through them, but the examination revealed nothing. (Some of the parts of the later volumes are unfortunately missing.) The next thought was to examine NEWCOMB's "Compendium of Spherical Astronomy," recently published by The Macmillan Company. One of the special, and also one of the most valuable, features of this book is the notes and references given at the end of the various chapters. So far as I have examined them these references seem to be correct and exact, except the references to the author's own "Elements and Constants." At no place apparently does he give an exact reference to it. On page 231 of the "Compendium," under the subject of precession and nutation, we find a small table of numerical quantities and a footnote, as follows: *"Astronomical Papers of the American Ephemeris,* vol. IV; 'Elements and Constants,' p. 186." Now *Astronomical Papers,* vol. IV, contains HILL's "Theory of *Jupiter* and *Saturn,"* and has nothing whatever to do with precession and nutation. "'Elements and Constants,' p. 186," is very illuminating. On page 249 "Elements and Constants" is again referred to in this abbreviated way in two footnotes, while OPPOLZER's classic work is referred to in detail, even to the date of publication. On page 255 we find a reference, "'The Elements of the Four Inner Planets and the Fundamental Constants of Astronomy,' published by the *American Nautical Almanac* in 1895," which is presumably the full title of "Elements and Constants," but still gives no information as to whether it was published as one of the *Astronomical Papers* or in the numbers of the *American Ephemeris and Nautical Almanac,* or otherwise. Further examination of the series of publications just mentioned revealed nothing. Still further search, however, brought a happy result. In *Astronomical Papers Prepared for the Use of the American Ephemeris and Nautical Almanac,* vol. VI, part II (Tables of *Mercury*), page 1, we find, "The elements of *Mercury* on which these tables are based are found in the author's work entitled. 'The Elements of the Four Inner Planets, and the Fundamental Constants of Astronomy,' forming a supplement to the *American Ephemeris and Nautical Almanac* for the year 1897, pp. 181-185," which gives the information which ought to have been given at a number of places where it was not. It is indeed a delightful pastime to spend one's vacation in work of search and research(?) of this kind. S. D. T.

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* *Astronomical Papers Prepared for the Use of the American Ephemeris and Nautical Almanac,* vol. VIII, part I. Washington, Bureau of Equipment, Navy Department.

Notes from "Science." — Dr. JOHANN GOTTFRIED GALLE, from 1851 to 1895, professor of astronomy and director of the observatory at Breslau, has celebrated his ninety-sixth birthday.

At the University of Indiana W. A. COGSHALL has been promoted from assistant professor to associate professor of astronomy.

Professor H. H. TURNER, F.R.S., has been elected correspondent of the Paris Academy of Sciences in the section of astronomy.

At Princeton University HENRY NORRIS RUSSELL and RAYMOND SMITH DUGAN have been made assistant professors of astronomy.

Sir GEORGE DARWIN, K.C.B., F.R.S., has been elected a foreign member of the Amsterdam Academy of Sciences.

The astronomical observatory and library founded in honor of MARIA MITCHELL, adjacent to her birthplace, on Nantucket, were formally dedicated on July 15th.

Professor A. O. LEUSCHNER, Director of the Students' Observatory of the University of California, who has been granted a year's leave of absence, left for the East in June. Most of the year will be spent in Berlin and Paris. During Dr. LEUSCHNER's absence the Students' Observatory will be in charge of Assistant Professor R. T. CRAWFORD as acting director.

Comet *Encke* was rediscovered May 27th, a month after perihelion passage, by WOODGATE at the Cape of Good Hope. The cometary objects photographed last December and January at Heidelberg, and at first announced as ENCKE's comet, are now thought to be fragments of it.—*Journal B. A. A.*

A fourth member of the TG or *Achilles* group of asteroids was recently announced. It is CS, discovered March 25th at Heidelberg, and will probably soon be known by a Homeric name, along with *Achilles, Patroclus,* and *Hector*. Special interest attaches to this group because of their approach to the conditions of the equilateral triangle solution in a system of three finite bodies. Each of them moves approximately in a vertex of an equilateral triangle that it forms with *Jupiter* and the Sun.

J. D. M.

In *Astronomische Nachrichten,* No. 4249, PAUL GUTHNICK finds that the variation of brightness of *Eros* depends on the phase-angle. *Eros* presents a greater range of phase than the normal asteroid because of the nearer approach of its orbit to the orbit of the Earth. It is also bright enough for measurement with ordinarily powerful photometric apparatus. The difficulty of connecting *Eros's* variation with change of phase augurs little success for similar research with the average asteroid. Taking SVEDSTRUP'S mean distance of the "mean asteroid" as 2.65 astronomical units, computation shows its change of magnitude due to phase to be only about $0^m.04$. Even from *Mars* the change is only $0^m.10$. J. D. M.

M. NORDMANN, of Paris, finds that violet light (wave-length 4300) arrives from *Algol* sixteen minutes later than red light (6800). In the case of λ *Tauri* the delay is three times as great. M. TIKHOFF, of Pulkowa, finds that violet light (4300) from RT *Persei* reaches us four minutes later than yellow light (5600); and that ultra-violet light (4000?) from W *Ursæ Majoris* follows orange light (6100?) by ten minutes. In 1903, M. BÉLOPOLSKY found that the orbit of β *Aurigæ* derived spectroscopically from indigo light (4500?) was in advance of the orbit from violet light. In each case, the retardation is greater for shorter waves. Its smallness leads Mr. GAVIN J. BURNS, writing in *Journal B. A. A.,* **18**, 328, 1908, to attribute it to an extensive atmosphere surrounding the star rather than to a resisting medium filling interstellar space. If due to the latter, we shall probably be able to translate retardation into distance in the case of stars of rapid light change. At present, *Algol* seems to be the only variable star whose parallax has been determined.

Meanwhile, Dr. SCHLESINGER[1] finds that *Algol's* eclipse is reported about two hours *earlier* by radial velocity determinations in ultra-violet light of wave-length 4200, than by visual observations (of average wave-length 5700 perhaps); and a similar lag exists in BÉLOPOLSKY'S[2] elements of this star. These results evidently demand a different explanation. None has yet been offered. J. D. M.

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[1] *Publications of the Allegheny Observatory,* **1**, 32, 1908.

[2] *Mitteilungen der Pulkowa Sternwarte,* **1**, 103, 1906.

The attention of members of the Society is called to the fact that the notice printed on the last page of the *Publications* has been revised.

Royal Observatory, Greenwich.—The annual visitation of the Royal Observatory took place June 4th, the Board of visitors being constituted as follows: Lord RAYLEIGH, Mr. H. F. NEWALL, Professor W. G. ADAMS, Professor J. LARMOR, Professor Sir J. NORMAN LOCKYER, Lord ROSSE, Principal Sir A. W. RÜCKER, Captain Sir W. DE W. ABNEY, Professor Sir R. S. BALL, Professor R. B. CLIFTON, Dr. J. W. L. GLAISHER, Sir W. HUGGINS, Mr. E. B. KNOBEL, Professor H. H. TURNER, Professor Sir G. H. DARWIN, Rear-Admiral A. MOSTYN FIELD (Hydrographer of the Navy), and Mr. W. D. BARBER (secretary). A large number of gentlemen interested in astronomy were present by invitation of the Astronomer Royal, and took part in the inspection of the observatory and instruments.

The Astronomer Royal presented his report, which deals with the work of the observatory during the past year. . . . It was discovered last year that the method of illuminating the field of the transit-circle by means of an elliptical annular reflector, lit by an axis lamp, was open to objection, as the tilting of the reflector to different points to produce various degrees of illumination caused a shift in the center of light, and an apparent shift in the wires; it is possible that part of the "magnitude equation" of faint stars arises from this cause. A uniform central illumination has now been substituted, a small elliptical reflector with a matt white surface being cemented to the center of the object-glass, reflecting the light of a small electric lamp; change in the degree of light is produced by altering the current through the lamp by a rheostat. This plan has been in use in the Altazimuth for a year with very satisfactory results; arrangements have been made on each instrument to take a few transits by the old method for the purpose of comparison. A new arrangement of wires has also been inserted in the collimators of the transit-circle, thin parallel wires replacing the thick oblique wires in former use. . . .

The 28-inch refractor has been used for the observation of double stars; 81 were observed with a distance of less than ½″, 95 between ½″ and 1″, 101 between 1″ and 2″, 211 over 2″. Among these κ *Pegasi* was observed on fifteen nights, δ *Equulei* on thirteen, and 70 *Ophiuchi* on sixteen. Mr. BOWYER is taking a special course of observations of this last star, with a view to settling the question of the inequalities in its motion. Observations of the diameters of *Jupiter* and his satellites have also been made with the 28-inch. With the 26-inch photographic refractor thirty-one photographs of *Neptune* and his satellites have been obtained; while with the 30-inch reflector *Phœbe* (the ninth satellite of *Saturn*) has been photographed on sixteen nights, *Jupiter VI* on thirty nights, *Jupiter VII* on twenty-one nights, *Jupiter VIII* on twelve nights, also fifty-four minor planets on 140 nights, Comet *d* 1907 (DANIEL) on thirteen nights, Comet *e* 1907 on eight nights. *Phœbe* is an excessively faint object of the 17th magnitude, discovered by Professor W. H. PICKERING in 1898, but it was not till last year that *Saturn* had come far enough north to permit the satellite to be photographed at Greenwich. These photographs will be of great use for giving an improved value of the mass of *Saturn*, which is uncertain to a small extent.

THE EIGHTH SATELLITE OF *JUPITER*.

The eighth satellite of *Jupiter* is a new discovery, made at the Royal Observatory by Mr. MELOTTE. Examining a photograph of the sixth and seventh satellites, taken at the end of February, he found an unknown moving body on the plate; looking back, he detected it on eight other plates taken during the preceding month. Since then exposures have been made on every fine night when the Moon was absent, but it has only been possible to photograph the object on four more nights, the last being on April 24th. In addition, it has been observed by Dr. WOLF at Heidelberg, and at the Lick Observatory. It appears to be a very distant satellite, at a distance of some sixteen million miles from *Jupiter*, and with an orbit inclined some 30° to his. Its period of revolution would thus be two years, its distance from the planet being two and one-half times that of the sixth and seventh satellites and 160 times that of the fifth satellite, which is the nearest to *Jupiter,* so that the range of distances in the Jovian family is much greater than in the Sun's family of planets. A further point of interest in the new satellite is that it appears to revolve around *Jupiter* in a retrograde direction, in opposition to all the other members of the family. In this point it resembles *Phœbe,* the outermost member of *Saturn's* family; Professor PICKERING suggests that the primitive rotation of the planet was retrograde, and that it was subsequently reversed by the action of solar tides; these distant satellites are supposed to have been born before the reversal, so that they are a relic of the primitive order. The new satellite is of the sixteenth magnitude, implying a real diameter of about thirty-five miles. Even as seen from the surface of *Jupiter* it would only be of the eighth magnitude, and so would be utterly invisible to the naked eye.

COMETS.

DANIEL'S comet was a very conspicuous object in the morning sky last August, probably brighter than any seen in these latitudes since 1882, and the photographs taken of it show a great amount of interesting detail. The tail was fan-shaped, and composed of a number of nearly straight jets diverging from the nucleus. This type has been exhibited by many recent comets. According to Professor BREDICHIN'S theory, the different jets have different specific gravities, and so are expelled from the nucleus with different velocities. Several plates were exposed last winter in the search for HALLEY'S comet, but without success. It is rather unfortunate that the region of search was in the Milky Way, between *Gemini* and *Monoceros,* and consequently the background is extremely richly strewn with faint stars, which makes the task of picking up an exceedingly faint object like the comet much more difficult. Next autumn the search will be resumed, with more prospect of success, as the comet will then be only slightly outside the orbit of *Jupiter,* and many comets have been followed to a greater distance than that. A large amount of computational work on this comet has been carried out by Messrs. COWELL and CROMMELIN. It consists of two parts—(1) to ascertain as accurately as possible the circumstances of the next return; (2) to carry back the perturbations as far as possible in order to test the accuracy of Dr. HIND's identifications in a paper he presented to the Royal Astronomical Society some fifty years ago. They find that the probable date of the next return is 1910, April 8, which is six weeks earlier than that given by DE PONTÉCOULANT. Unfortunately, the new date means a less fine display in these latitudes, for, though the comet will make a near approach to the earth on 1910, May 10, it will then be some 20° south of the Sun, and so will set very soon after him. The conditions in the Southern Hemisphere will be much more favorable. The other research has been carried back to the year A. D. 760, and on the whole Dr. HIND's results are confirmed, though he is shown to be ten months too late in 1223, four months too early in 912, one and one-half months too late in 837. The most interesting appearance on the list is the famous comet which preceded the Norman conquest in 1066; contemporary accounts and the Bayeux tapestry give a vivid idea of its splendor, and of the lively apprehension it excited in England. HIND was the first to suggest that this was a return of HALLEY's comet, and his suggestion has now been confirmed beyond doubt. The corrections found for HIND's dates in all cases bring them nearer to the curve published by Dr. ÅNGSTRÖM in 1862, a fact which renders the total failure of this curve for the next return very surprising. (The date for the curve is 1913 instead of 1910.) . . . —*The London Times.*